WE CLAIM:

1. A marker for the detection of free radical damage, comprising modified albumin, wherein said albumin is modified in a manner which results in inhibition of the metal binding capacity of the N-terminus of said albumin.

2. The marker of Claim 1, wherein said albumin is human serum albumin.

3. A method for detecting or quantifying free radical damage comprising detecting and quantifying the marker of Claim 1, the method comprising the steps of:

(a) providing a biological sample containing albumin;

(b) providing a metal ion salt, the metal ion of which is capable of binding to the N-terminus of unmodified albumin;

(c) contacting the biological sample with an excess quantity of the metal ion salt so that a mixture of bound metal ions and unbound metal ions is formed;

(d) determining the quantity of bound metal ions; and

(e) correlating the quantity of bound metal ions to a known value to determine the quantity of the marker present in the sample and if the quantity of the marker is sufficient to indicate free radical damage.

4. The method of Claim 3, wherein said sample is serum or plasma.

5. The method of Claim 3, wherein said sample is purified albumin.

6. The method of Claim 3, wherein said metal ion salt is a salt of a transition metal ion of Groups 1*b*-7*b* or 8 of the Periodic Table of the elements.

7. The method of Claim 3, wherein said metal ion salt is a salt of a metal selected from the group consisting of V, As, Co, Sb, Cr, Mo, Mn, Ba, Zn, Ni, Hg, Cd, Fe, Pb, Au, Cu and Ag.

8. The method of Claim 3, wherein said metal ion salt is a cobalt salt.

9. The method of Claim 3, wherein step (d) is conducted using atomic absorption or atomic emission spectroscopy.

10. The method of Claim 3, wherein step (d) is conducted using an immunological assay.

11. The method of Claim 3, further comprising separating the bound metal ions from the unbound metal ions prior to performing step (d).

12. The method of Claim 3, wherein said excess quantity of metal ion salt is a predetermined quantity and the method further comprises determining the quantity of unbound metal ions and using the quantity of unbound metal ions to determine the quantity of bound metal ions.

13. The method of Claim 12, wherein determination of the quantity of unbound metal ions is conducted using atomic absorption or atomic emission spectroscopy.

14. The method of Claim 12, wherein determination of the quantity of unbound metal ions is conducted using an immunological assay.

15. The method of Claim 12 further comprising:

(a) adding the peptide Asp Ala His Lys [SEQ ID NO:1] to the mixture containing bound metal ions and unbound metal ions, the peptide being capable of binding the unbound metal ions in the mixture, and

(b) determining the quantity of metal ions bound to the peptide to determine the quantity of unbound metal ions.

16. The method of Claim 15, further comprising:

separating the bound metal ions from the unbound metal ions before adding the peptide or separating the peptide from the mixture after the metal ions are bound to it, and

determining the quantity of metal ions bound to the peptide.

17. The method of Claim 12 further comprising:

(a) adding a compound having the formula Asp-Ala-His-Lys-R to the mixture containing bound metal ions and unbound metal ions, the compound being capable of binding the unbound metal ions in the mixture, and R being a group capable of producing a detectable signal when the metal ion is bound to the compound, and

(b) detecting the signal produced by R to determine the quantity of unbound metal ions present in the mixture.

18. The method of Claim 17, further comprising:

separating the bound metal ions from the unbound metal ions before adding the compound or separating the compound from the mixture after the metal ions are bound to it, and

detecting the signal produced by R to determine the quantity of metal ions bound to the compound.

19. The method of Claim 12 wherein the metal salt is a salt of a metal selected from the group consisting of V, As, Co, Sb, Cr, Mo, Mn, Ba, Zn, Ni, Hg, Cd, Fe, Pb, Au, Cu and Ag, and the method further comprises:

(a) contacting said mixture with an aqueous solution of a color forming compound which is capable of producing a color when bound to said metal ion so as to form a colored solution, and

(b) determining the color intensity of the colored solution to determine the quantity of the unbound metal ions.

20. The method of Claim 19, further comprising diluting said colored solution with an aqueous solution isosmotic with blood serum or plasma prior to step (b).

21. The method of Claim 19, wherein said color forming compound is ferrozine.

22. The method of Claim 19, wherein said color forming compound is Asp-Ala--His-Lys-R', wherein R' is any group capable of producing a color when the metal ion is bound to the compound.

23. The method of Claim 19, wherein said steps (a) and (b) are conducted in a pH range of 7 to 9.

24. The method of Claim 19, wherein said step (b) is conducted using a spectrophotometer.

25. The method of Claim 19, wherein said sample is serum or plasma.

26. The method of Claim 19, wherein said sample is purified albumin.

27. The method of Claim 19, wherein said metal ion salt is a salt of cobalt.

28. A method for detecting or quantifying free radical damage comprising detecting and quantifying the marker of Claim 1, the method comprising the steps of:

(a) determining the quantity of copper ions present in a purified albumin sample, and

(b) correlating the quantity of copper ions present in the sample with a known value to determine the quantity of the marker present in the sample and if the quantity of the marker is sufficient to indicate free radical damage.

29. The method of Claim 28, wherein step (a) is conducted using atomic absorption or atomic emission spectroscopy.

30. The method of Claim 28, wherein step (a) is conducted using an immunological assay.

31. A compound having the formula Asp-Ala-His-Lys-R, wherein R is any chemical group capable of providing a detectable signal when the compound is bound to a metal ion capable of binding to the N-terminus of unmodified human albumin.

32. An antibody that binds specifically to the marker of Claim 1.

33. An antibody that binds specifically to the peptide Asp Ala His Lys [SEQ ID NO:1] having a metal ion bound thereto.

34. An immunological assay conducted using as an antigen the marker of Claim 1.

35. An immunological assay conducted using the antibody of Claim 32.

36. An immunological assay conducted using the antibody of Claim 33.

37. A method of monitoring or assessing a disease or condition in which free radicals play a role, monitoring or assessing treatment of such a disease or condition, or both, the method comprising detecting and quantifying the marker according to the method of Claim 3, 12 or 28.

38. A method of monitoring or assessing treatment of a disease or condition with a compound that produces or reduces free radicals comprising detecting and quantifying the marker according to the method of Claim 3, 12 or 28.

39. The method Claim 38 wherein the compound is a free radical scavenger.

40. The method Claim 38 wherein the compound is porfimer sodium.

41. A kit for detecting or quantitating free radical damage comprising a container holding a metal ion salt and a container holding a peptide having the sequence Asp Ala His Lys [SEQ ID NO:1].

42. A kit for detecting or quantitating free radical damage comprising a container holding a compound of the formula Asp-Ala-His-Lys-R, where R is a group capable of producing a detectable signal when a metal ion that is capable of binding to the N-terminus of unmodified albumin is bound to the compound.

43. The kit of Claim 42 further comprising a container holding a metal ion salt.

44. A kit for detecting or quantitating free radical damage comprising a container holding an antibody that binds specifically to the peptide Asp Ala His Lys [SEQ ID NO:1] having a metal ion bound thereto.

45. The kit of Claim 44 further comprising a container holding a metal ion salt.

46. A kit for detecting or quantitating free radical damage comprising a container holding an antibody that binds specifically to the marker.

47. The kit of Claim 46 further comprising a container holding a metal ion salt.